Our Dermatology Online

Case Report

Cutaneous mycobacteriosis due to Mycobacterium thermoresistibile secondary to mesotherapy: A case report

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ABSTRACT

Mycobacteria are ubiquitous microorganisms that are found in the environment, particularly in water and soil. Nontuberculous mycobacteria (NTM) comprise a group that are distinct from the *Mycobacterium tuberculosis* complex and *Mycobacterium leprae*. Traditionally, they are classified according to their in vitro growth rate into rapidly growing mycobacteria (RGM) and slowly growing mycobacteria (SGM). Host–mycobacteria interactions are diverse, ranging from commensalism as well as primary and opportunistic pathogenic behavior. We report the case of a 34-year-old female who developed subcutaneous nodules, inflammation, and abdominal deformity following mesotherapy at an unaccredited aesthetic clinic. *Mycobacterium thermoresistibile* was isolated from clinical specimen and the patient was successfully treated with a triple-antibiotic regimen.

Key words: Nontuberculous mycobacteria infection, Mesotherapy, Mycobacterium thermoresistibile

INTRODUCTION

Mycobacteria are ubiquitous microorganisms widely distributed in the environment, particularly in water and soil. Nontuberculous mycobacteria (NTM)—also known as atypical, opportunistic, environmental, or unclassified mycobacteria—comprise a diverse group of species distinct from the *Mycobacterium tuberculosis* complex and *Mycobacterium leprae* [1]. Their relationship with the host is variable, behaving as commensals, pathogens, or opportunists [1,2]. To date, over 266 species have been identified. Although most NTM species are considered commensal, some are pathogenic to humans [3]. In clinical practice, infections caused by these organisms are collectively referred to as atypical mycobacterial infections [4].

CASE REPORT

A 34-year-old woman with no significant past medical history presented with cutaneous lesions following mesotherapy. She reported the onset of inflammatory areas during the first and second months after receiving injections at an unaccredited aesthetic clinic. Initially, she attempted to manipulate the lesions herself and subsequently, they were managed at the same facility with punctures and incisions. She received multiple one to two-week courses of various antibiotics and analgesics, including ciprofloxacin, meloxicam with methocarbamol, dicloxacillin, ibuprofen, probiotics, clarithromycin, moxifloxacin, serratiopeptidase, lysine clonixinate, amoxicillin, loratadine, clindamycin, ceftriaxone, ketorolac and guaifenesin, without clinical improvement. Due to persistent symptoms, an ultrasound was performed, revealing deep abscesses. The patient was then referred to the Dermatology Center of Yucatán. On examination, a localized dermatosis was observed on the lower trunk, extending from the abdomen, over the right flank, and to the left suprapubic region. Lesions consisted of irregular and ovoid subcutaneous nodules measuring approximately 1 × 2.5 cm and 2 × 3.5 cm along their major axes.

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They were firm, associated with scars, and light brown hyperpigmented macules. Irregular areas of swelling with an ecchymotic surface and regional deformity were also noted (Fig. 1). The lesions were tender to palpation. A skin biopsy was obtained for histopathological evaluation, which showed granulomatous dermatitis characterized by epithelioid histiocytes, sparse lymphocytes, microabscess formation, and areas of granulation tissue. Hematoxylin and eosin staining was suggestive of mycobacterial infection, and Kinyoun staining revealed numerous acid-fast bacilli (AFB) (Fig. 2). A smear of seropurulent exudate submitted to the central laboratory confirmed the presence of acid-fast bacilli, with results reported verbally. Molecular analyses of tissue, including polymerase chain reaction (PCR) for mycobacteria and restriction fragment length polymorphism (RFLP), subsequently identified *Mycobacterium thermoresistibile*. The patient was treated with a triple-antibiotic regimen—minocycline, trimethoprim/sulfamethoxazole, and clarithromycin—combined with analgesics for pain management. Although gradual improvement was observed from the third month, the patient's response to therapy was overall slow, and treatment was continued for a total of one year. Complete clinical resolution was ultimately achieved (Fig. 3).

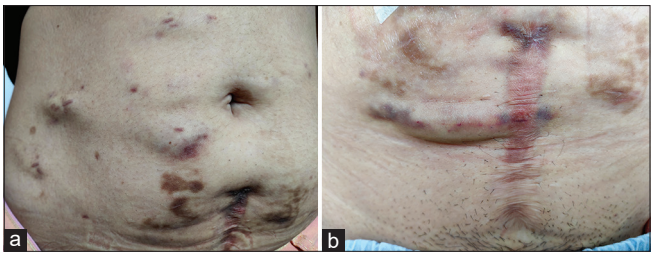

Figure 1: (a) Irregular subcutaneous nodules with firm consistency, associated scars and light brown hyperpigmented macules with areas of localized swelling. (b) Ecchymotic-appearing surface and regional deformity.

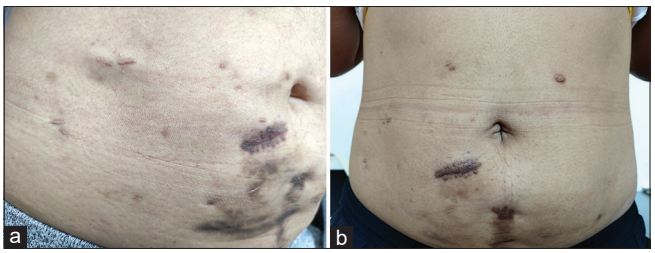

Figure 2: (a) Initial improvement with therapy, showing reduction of subcutaneous lesions and the adjacent biopsy scar. (b) Resolution of ecchymotic appearance and local deformity after one year of antimicrobial therapy with a triple-drug regimen.

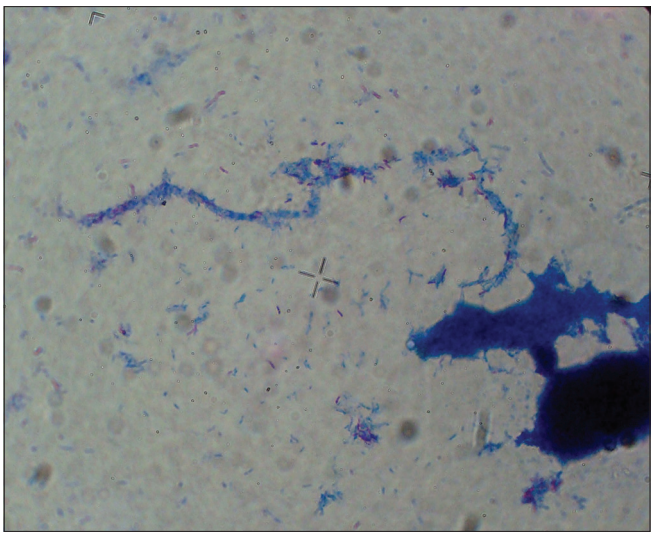

Figure 3: Kinyoun stain demonstrating abundant acid-fast bacilli (100×).

DISCUSSION

Nontuberculous mycobacteria (NTM) are acid-fast bacilli that are aerobic or microaerophilic, non-motile, and facultatively intracellular, belonging to the phylum Actinobacteria [2,5]. Traditionally, they are classified according to their in vitro growth rate into rapidly growing mycobacteria (RGM), which form mature colonies on solid agar within ≤7 days, and slowly growing mycobacteria (SGM), which require more than 7 days [6]. They can also be grouped based on their pigment production and response to light exposure according to the Runyon classification. In this system, mycobacteria are divided into photochromogens, which produce carotenoid pigment after light exposure; scotochromogens, which produce pigment regardless of light exposure; and nonchromogens which do not produce visible pigment [1]. These organisms are ubiquitous in the environment, particularly in water and soil, and exhibit a high capacity for biofilm formation which may facilitate their transmission [2].

NTM are associated with a wide spectrum of clinical syndromes, comprising pulmonary infections, skin and soft tissue infections, osteoarticular involvement, lymphadenitis, device-associated infections, and disseminated disease, with pulmonary infections being the most common [4]. Cutaneous involvement typically arises from direct inoculation of the pathogen, often following trauma with needles, splinters, or thorns, through contamination of surgical wounds or from invasive procedures such as mesotherapy, liposuction, dermal filler injections, piercings, and tattoos [5].

Table 1: Characteristics of patients with cutaneous lesions and isolation of *M. thermoresistibile* reported in the literature [13-18]

Author, country, year	Age/ sex	Comorbidities	History	Lesions	Diagnosis	Treatment	Treatment duration
Neely, USA, 1989 [15]	41/M	Ischemic cardiomyopathy, diabetes	Ventricular assist device placement, heart transplant	Nodule at surgical scar, pustules	Culture	Debridement, isoniazid, rifampicin, ethambutol	Indefinite
Wolfe, USA, 1992 [18]	41/F	None	Breast augmentation	Breast abscesses	Culture	Rifampicin, ethambutol	16 months
Cummings, USA, 2000 [13]	NR/F	NR	Trauma with gardening scissors	Violaceous plaque	Culture, HPLC; coinfection with *M. fortuitum*	Levofloxacin, doxycycline	3 months
LaBombardi, USA, 2005 [14]	73/F	Diabetes	Bilateral arthroplasty	Knee edema and discharge	Culture, MIDI	Moxifloxacin, linezolid (later switched to doxycycline)	7 months
Tu, Australia, 2025 [17]	54/F	None	Wide local excision, mastectomy due to ductal carcinoma in situ	Persistent surgical wound dehiscence	PCR	Clarithromycin, ethambutol, rifampicin	12 months
Present case	34/F	None	Mesotherapy	Subcutaneous nodules, local deformity	Smear, biopsy, PCR, RFLP	Minocycline, trimethoprim-sulfamethoxazole, clarithromycin	12 months

Cutaneous NTM infections present a broad spectrum of clinical manifestations, such as papules, plaques, nodules, abscesses, fistulous tracts, ulcers, panniculitis, folliculitis, and cellulitis. Sporotrichoid distribution and disseminated reactive manifestations, such as Sweet's syndrome, generalized pustulosis, erythema nodosum, and pustular psoriasis, have also been reported [2,6,7]. Rapidly growing mycobacteria, particularly *M. abscessus*, *M. chelonae*, and *M.xfortuitum*, are most frequently associated with cutaneous involvement [2], whereas *M. marinum* is the primary slow-growing species associated with skin involvement [7].

M. thermoresistibile is a rarely documented NTM species, first isolated by Tsukamura in 1966 and described as a rapidly growing organism capable of growth at 52°C [8]. It was recognized as a human pathogen in 1981 following isolation from a patient with pneumonia [9]. This species belongs to the RGM and can grow between 37 and 45°C, with an optimal temperature of 42°C and tolerance up to 60°C. Its thermophilic preference underlies its name and may partly explain why conventional laboratory culture techniques are sometimes insufficient for its identification [10,11]. To date, twelve cases have been reported in the literature in which *M. thermoresistibile* acted as a pathogen in diverse clinical contexts, including pulmonary, cutaneous, articular, and disseminated infections [9-20]. The clinical and therapeutic characteristics of previously reported cutaneous cases are summarized in Table 1. Polymerase chain reaction (PCR) remains the diagnostic method of choice [1]. As with other NTM infections, management is often challenging and requires prolonged multi-drug regimens. Although no official guidelines exist, therapy should ideally be guided by antimicrobial susceptibility testing, however, due to the difficulty of culturing this organism, such testing is not always feasible, as illustrated in the present case [11].

CONCLUSIONS

Infection with *Mycobacterium thermoresistibile* in humans is exceedingly rare. This report describes the first documented case of cutaneous mycobacteriosis in Mexico (the sixth worldwide) and the first associated with mesotherapy. Management of these infections poses significant diagnostic and therapeutic challenges due to difficulties in obtaining microbiological isolation and susceptibility testing, often necessitating empiric therapy based on regimens used for other rapidly growing mycobacteria.

In the present case, clinical response to therapy was slow but favorable, reflecting the consequences of inadequate initial management. These findings underscore the importance of initiating timely antimicrobial therapy guided by a confirmed diagnosis, even in the absence of susceptibility data, and avoiding short empiric regimens that may promote microbial multidrug resistance. Additionally, this case highlights the need to raise awareness regarding the risks of performing aesthetic procedures in unaccredited facilities.

Consent

The examination of the patient was conducted according to the principles of the Declaration of Helsinki.

The authors certify that they have obtained all appropriate patient consent forms, in which the patients gave their consent for images and other clinical information to be included in the journal. The patients understand that their names and initials will not be published and due effort will be made to conceal their identity, but that anonymity cannot be guaranteed.

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